

REMARKS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1-10 are currently pending. Claims 1-3 and 5 have been amended; and Claims 6-10 have been added by the present amendment. The changes and additions to the claims are supported by the originally filed specification and do not add new matter.

In the outstanding Office Action, the specification was objected to as containing various informalities; Claims 1-3 were objected to as containing informalities; Claims 1, 2, 4, and 5 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Application Publication No. 2003/0030737 to Yanai (hereinafter “the ‘737 application”) in view of U.S. Patent No. 6,532,264 to Kahn (hereinafter “the ‘264 patent”); and Claim 3 was rejected under 35 U.S.C. § 103(a) as being unpatentable over the ‘737 application and the ‘264 patent, further in view of U.S. Patent No. 6,130,420 to Tanaka et al. (hereinafter “the ‘420 patent”).

Applicants respectfully submit that the objections to the specification are rendered moot by the present amendment to the specification. The specification has been amended to address the informalities noted in the outstanding Office Action. Accordingly, the objections are believed to have been overcome.

Applicants respectfully submit that the objections to the claims are rendered moot by the present amendment to the claims. Claims 1-3 have been amended to address the informalities noted in the outstanding Office Action. Accordingly, the objections to the claims are believed to have been overcome.

Amended Claim 1 is directed to an imaging apparatus, comprising: (1) a color image pick-up device constituting an image in one frame by a plurality of fields for imaging an image of an object having an output capable of carrying out a playback of an image in each of

the fields; (2) a driving circuit for driving the color image pick-up device; (3) a timing generating circuit for generating a drive timing of the color image pick-up device; and (4) a signal processing device for processing an output signal of the color image pick-up device. Further, Claim 1 clarifies that pixels of a same color in each of all said fields are added when a luminance of the image of the object is determined to be low and when the object is determined to be not moving according to a comparison between outputted images which are in adjacent fields of the color image pick-up device. The changes to Claim 1 are supported by the originally filed specification and do not add new matter.¹

Regarding the rejection of Claim 1 under 35 U.S.C. § 103, the Office Action asserts that the '737 application discloses everything in Claim 1 with the exception of "determining if the difference of the luminance between adjacent field is small,"² and relies on the '264 patent to remedy that deficiency.

Applicants respectfully submit that the rejection of Claim 1 (and dependent Claims 4 and 5) is rendered moot by the present amendment to Claim 1.

The '737 application is directed to an image pick-up apparatus that includes a plurality of pixels arranged in a horizontal direction and a vertical direction that generate charges corresponding to optical signals. Further, the '737 patent discloses a driving circuit having various modes including a first mode for reading out pixel data of $2k+1$ fields using an interlace operation from the plurality of pixels; a second mode for reading out pixel data of one field among the $2k+1$ fields; and a third mode for reading out images of a plurality of fields, the number of fields being smaller than that of the $2k+1$ fields. For example, as shown in Figures 7 and 8, the '737 application discloses that "if an amount of light of an object decreases and a screen becomes dark during photography in the second photographing mode, the level detection circuit detects a declined output level of the solid state image pick-up

¹ See, e.g., pages 2 and 9 of the specification.

² See page 4 of the outstanding Office Action.

element and the synchronization control circuit switches the control mode to this third photographing mode.”³ In this regard, the ‘737 application discloses that, in the third photographing mode, the first and third fields are read out, added up, and output.

However, Applicants respectfully submit that the ‘737 patent fails to disclose the timing generating circuit for generating a drive timing of the color image pick-up device, as recited in Claim 1. Rather, Applicants respectfully submit that the sync control circuit 14 disclosed in Figure 3 of the ‘737 application is merely an element for switching the photographing mode of the ‘737 device and “controlling the entirety of” the ‘737 image pick-up apparatus.⁴ Applicants respectfully submit that the ‘737 application does not disclose that the synchronization control circuit has anything to do with timing generation or for generating a drive timing of the color image pick-up device, as recited in Claim 1.

Further, Applicants respectfully submit that the ‘737 application fails to disclose that pixels of a same color in each of all the fields are added when a luminance of the image of the object is determined to be low and when the object is determined to be not moving according to a comparison between outputted images which are in adjacent fields of the color image pick-up device, as recited in amended Claim 1. In this regard, Applicants note that in the third mode disclosed by the ‘737 application, only the first field and the third field among the three fields are added up in the vertical CCDs, and output. On the contrary, Claim 1 requires that pixels of a same color in all of the fields be added. Moreover, Applicants respectfully submit the ‘737 application does not disclose that pixels of a same color in each of all the fields are added (1) when a luminance of the object is determined to be low, and (2) when the object is determined to be not moving according to a comparison between outputted images, as recited in Claim 1. The ‘737 application is silent regarding this limitation. Rather, the ‘737 patent merely discloses that when the amount of light of an object decreases and the

³ See paragraph 64 of the ‘737 application.

⁴ See paragraph 52 of the ‘737 application.

screen becomes dark, the '737 apparatus switches to the third photographing mode, which adds the first and third fields. The '737 application does not disclose that whether the object is determined to be not moving according to a comparison between outputted images which are in adjacent fields is used as a criteria for adding pixels of the same color in each of all the fields, as recited in Claim 1.

In an non-limiting example, Applicants note that an advantage of the present invention is that by adding the respective fields having the same color pixels, sensitivity can be enhanced approximately three times more than a conventional image.⁵ Moreover, in a non-limiting example, the amount of blurring due to movement of the operator, as well as power consumption can be reduced by the present invention.

Turning now to the secondary reference, the '264 patent is directed to a method for detecting image motion among at least two video images, each image represented by a plurality of pixels. Further, the '264 patent discloses that the method includes comparing first information obtained from pixels used to represent a first image with second information obtained from pixels used to represent a second image to produce a correlation surface representative of image motion. Further, the '264 patent discloses that the method includes the step of extracting a motion from the correlation data and producing a measure of confidence of accuracy which the motion vector has generated.

However, Applicants respectfully submit that the '264 patent fails to remedy the deficiencies of the '737 application as discussed above. In particular, Applicants respectfully submit that the '264 application fails to teach or suggest that pixels of a same color in each of all the fields are added when (1) a luminance of the image of the object is determined to be low, and (2) when the object is determined to be not moving according to a comparison to

⁵ See page 10 of the outstanding Office Action.

outputted images which are in adjacent fields of the color image pick-up device, as recited in Claim 1.

Thus, no matter how the teachings of the '737 application and the '264 patent are combined, the combination does not teach or suggest that pixels of a same color in each of all the fields are added when a luminance of the image of the object is determined to be low and when the object is determined to be not moving according to a comparison between outputted images which are in adjacent fields of the color image pickup device, as recited in amended Claim 1. Accordingly, Applicants respectfully submit that amended Claim 1 (and dependent Claims 4 and 5) patentably define over any proper combination of the '737 application and the '264 patent.

Amended Claim 2 recites limitations analogous to the limitations recited in Claim 1. In particular, Applicants note that Claim 2 recites the color image pick-up device, the driving circuit, the timing generating circuit, and the signal processing device recited in Claim 1. However, Claim 2 clarifies that pixels of a same color and each of all the fields are added after re-exposing a next field which is a next field of adjacent fields of the color image pick-up device when a luminance of the image of the object is determined to be low and when the object is determined to be not moving according to a comparison between outputted images which are in the adjacent fields of the color image pick-up device.

Applicants respectfully submit that the rejection of Claim 2 is rendered moot by the present amendment to Claim 2. In particular, for reasons analogous to the reasons stated above for the patentability of Claim 1, Applicants respectfully submit that the combined teachings of the '737 application and the '264 patent fail to disclose that pixels of a same color in each of all the fields are added when a luminance of the image of the object is determined to be low and when the object is determined to be not moving according to a comparison between outputted images which are in adjacent fields of the color image pick-up

device, as recited in Claim 2. Moreover, Applicants respectfully submit that the combined teachings of the '737 application and the '264 patent does not teach or suggest that the pixels of a same color in all the fields are added after re-exposing a next field which is the next field of adjacent fields of the color image pick-up device, as recited in Claim 2. See page 8 and 9 of the outstanding Office Action for a non-limiting example of the invention recited in Claim 2. Rather, the '737 patent merely discloses that in the third photographing mode, the mechanical shutter is always open such that the '737 invention extends the exposure time and adds the readout pulses in the first and third fields when the luminance of the object is low. See paragraph [0065] of the '737 application.

Accordingly, for the reasons stated above, Applicants respectfully submit that Claim 2 patentably defines over any proper combination of the '737 application and the '264 patent.

Regarding the rejection of Claim 3 under 35 U.S.C. § 103, Applicants respectfully submit that the '420 patent fails to remedy the deficiencies of the '737 application and the '264 patent, as discussed above. Accordingly, Applicants respectfully submit that the rejection of Claim 3 is rendered moot by the present amendment to Claim 2.

The present amendment sets forth new Claims 6-10 for examination on the merits. New Claims 6-10 correspond to pending Claims 1-5. However, Claim 6 explicitly recites a controller configured to add pixels of a same color in each of all the fields when luminance of the image of the object is determined to be low and when the object is determined to be not moving according to a comparison between outputted images. Similarly, new Claim 7 recites a controller corresponding to the limitations recited in Claim 2. Claims 6-10 are supported by the originally filed specification and do not add new matter.⁶ Moreover, based on the asserted allowability of Claims 1-5, Applicants respectfully submit that new Claims 6-10 patentably define over the cited references.

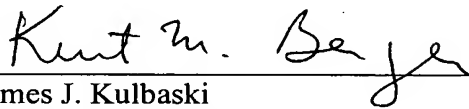
⁶ See, e.g., pages 4 and 5 (CPU 14) of the specification.

Thus, it is respectfully submitted that independent Claims 1, 2, 6, and 7 (and all associated dependent claims) patently define over any proper combination of the '737 application, the '264 patent, and the '420 patent.

Consequently, in view of the present amendment and in light of the above discussion, the outstanding grounds for rejection are believed to have been overcome. The application as amended herewith is believed to be in condition for formal allowance. An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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